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ABSTRACT OF THE DISCLOSURE

5 A planarization process for filling spaces
between patterned metal features formed over a
surface of a semiconductor substrate. The
patterned metal features are preferably coated
with a dielectric barrier. The dielectric
10 barrier is coated with an material that expands
during oxidation or nitridization to a thickness
about half the depth of the space between
metallized features. The layer is then plasma
oxidized using an RF or ECR plasma at low
15 temperature with an oxygen ambient.
Alternatively, the layer is plasma nitridized at
low temperature. The plasma oxidation or
nitridization is continued until the expandable
material is converted to a dielectric and has
20 expanded to fill the space between patterned
metal features. Optionally, the process can be
followed by a mechanical or chemical mechanical
planarization step.

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